

## The International Existing Building Code

This document defines the laws required in new construction for the state of California as well as for many other jurisdictions throughout the country. This code was first published in 1927 and the edition currently in use is the 2006 edition. It is commonly referred to as the IEBC or simply "The Code." This is an important document because it provides designers with basic information and tables that can be used in seismic retrofit work. It specifies how new walls are to be framed and tells the designer how strong shear walls will be if they are built in accordance with a certain table. When any city or state building inspector looks at construction work he makes sure that it complies with this code. The International Existing Building Code is not much use in designing seismic retrofits because it applies primarily to new construction. Only one section, chapter 303.2.3.1 in the chapter entitled Existing Structures gives guidelines for seismic retrofit work.

**SECTION 303.2.3.1-EXCEPTION:** Alterations of existing structural elements, or additions of new structural elements, which are not required by Section 3401 and are initiated for the purpose of increasing the lateral-force-resisting strength or stiffness of an existing structure, need not be designed for forces conforming to these regulations provided that an engineering analysis is submitted to show that

1. The capacity of existing structural elements required to resist forces is not reduced,
2. The lateral loading to required existing structural elements is not increased beyond their capacity,
3. New structural elements are detailed and connected to the existing structural elements as required by these regulations,
4. New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by these regulations, and
5. An unsafe condition as defined above is not created.

What this translates to in local Bay Area Building Departments is: "If it does not look like it will hurt the house, grant a building permit." Building departments in fact do not require the engineering analysis that is mentioned in paragraph one. This is because adding any type of hardware, nailing up plywood, etc. will never create an unsafe condition. The only portion of the code that building departments take seriously is subparagraph number 4; meaning, if you install hardware somewhere make sure you put it on the plans. Whether it resists earthquakes or not is not the building department's concern. It is interesting to read what one local Bay Area building official wrote in this regard:

"You have raised a very real issue. We (local agencies) cannot legally refuse to issue a permit as long as what is proposed does not violate any codes or ordinances. We have seen what you describe many times. What we have discussed in the past is making sure the description of work on the permit doesn't include wording such as "seismic retrofit", "seismic strengthening", "earthquake strengthening", etc. If they are installing "shiny hardware" note on the permit "install framing clip" or some other description. Other than something along this line I don't know any way to prevent what you describe from occurring, other than educating the public. One of the reasons we are working on updating the San Leandro program is to develop a standardized, acceptable plan that can be used and will be acceptable for "seismically strengthening" a home. Hopefully,

additional plans will be developed in the future to give the homeowners, and local jurisdictions, additional options.

I think we all agree that, as building departments, there are some legal and political constraints on what we can and cannot do. We also understand that consistency in how we collectively handle retrofits is critical.”

### **The 2006 International Existing Building Code handbook states:**

“The basic requirement of Section 3403.2 is that any structural alteration or repair made to an existing building fully comply with all applicable provisions of the currently adopted code.

Prior to the 1994 edition of the Uniform Building Code, there were no provisions to address voluntarily increasing the strength or stiffness of an existing building’s lateral-force-resisting system. If such work were to be undertaken, then full compliance with the current code would be required. An exception now permits such voluntary strengthening, provided an engineering analysis is submitted to show compliance with stated objectives. **(Editor’s note: This analysis is never required in the eight or so building departments I work with because it is hard not to show that the stated objective of “increasing the lateral-force-resisting strength” has not been met. In Berkely they just stamp the plans with a stamp that says “no lateral analysis has been done.” According to section 3403.2, there is no stated objective except to make sure the building is not being damaged. Installing hardware to resist hurricanes or gravity does meet this objective).** This exception permits existing structural elements to be altered and new structural elements to be installed for the purpose of increasing the strength or stiffness of the lateral-force-resisting system. The exception specifies that the design forces need not comply with the current code requirements. No force level is specified. However, the exception states that the capacity of existing structural elements required to resist forces may not be reduced; thus, compliance with forces at least equal to original design force levels seems to be implied. **(Editor’s note: Building departments interpret this as meaning any work that does not harm the building should be approved, even though based on what I have seen much approved work would actually harm the building in an earthquake).**

Before the exception was added to the code, there was a disincentive for improving lateral-force-resisting elements because one had to either provide full compliance or do nothing. Improving the lateral-force-resisting capacity of a building’s structural system can be extremely beneficial, even when it is not possible to gain full compliance with current code force levels. This should encourage rather than discourage strengthening. The exception states that work may be undertaken when not required by Section 3401. Since Section 3401 does not specifically address structural work, the intent of the reference is not clear.

What is clear from the original proposal is that the exception was intended to apply only when voluntary strengthening of an existing building was proposed. The exception should not be used as a reason for reducing force levels to be taken by existing lateral force-resisting elements which will be used to brace an addition.”